

PATENT SPECIFICATION

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PROVISIONAL SPECIFICATION

Improvements in or relating to the Preparation of Brewers' Worts

We, Dr. HEINRICH ULLMANN, an Austrian citizen, of 36b, Boulevard Carnot, Le Vesinet, Paris, France, and THE ALUMINIUM PLANT & VESSEL COMPANY LIMITED, of Point Pleasant, Wandsworth, London, S.W.18, a British Company, do hereby declare the nature of this invention to be as follows:—

10 This invention relates to the preparation of brewers' worts and has for its object the provision of an improved method of and apparatus for enabling the heating of the worts to be effected.

15 In the processes at present in use, the worts are usually heated or boiled for a predetermined period of the order of several hours in a copper or heating vessel provided with a steam jacket or other suitable heating means.

20 According to the present invention the heating is carried out in a heater such as, for example, a plate-type heat exchanger, which is separate from the copper or vessel and the latter is employed as a receiving vessel for the heated wort and means such as a centrifugal pump is provided for passing the worts through the heater and into the associated receiving vessel and, if desired, for maintaining a con-

tinuous circulation of the worts through 30 the heater and the associated receiving vessel. In this way, the heating is rendered capable of regulation to suit the type of malt being heated a considerable diminution of the heating period is made 35 possible and better flocculation can be obtained. In the receiving vessel the pressure is preferably maintained at atmospheric pressure or thereabouts and, for this purpose, the vessel may, if desired, 40 be an open-top vessel. At a suitable point in the system, means is preferably provided for maintaining the pressure on the heating system at a value dependent upon the temperature to which it is de- 45 sired to heat the wort. Also, if desired, the hops can be placed in a separate vessel so associated with the system or circuit that the wort can be caused to pass through such vessel for hop extraction 50 purposes and if desired, such vessel may be arranged in a valve-controlled bye pass.

Dated this 22nd day of October, 1937.

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COMPLETE SPECIFICATION

Improvements in or relating to the Preparation of Brewers' Worts

55 We, Dr. HEINRICH ULLMANN, an Austrian citizen, of 36b, Boulevard Carnot, Le Vesinet, Paris, France, and THE ALUMINIUM PLANT & VESSEL COMPANY LIMITED, of Point Pleasant, Wandsworth, London, S.W.18, a British Company, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

65 This invention relates to the preparation of brewers' worts and has for its object the provision of an improved method of and apparatus for enabling the heating of the worts to be effected.

70 In the processes at present in use, the worts are usually heated or boiled for a predetermined period of the order of several hours in a copper or heating vessel

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provided with a steam jacket or other suitable heating means. 75

It is also known to boil and evaporate worts at pressures above atmospheric but the methods adopted or proposed heretofore have manifested the defect that the total quantity of fluid to be treated is exposed for much too long a period to the high temperature and it has been found that continued exposure to high temperatures has a deleterious effect on the taste of the liquor. 80

It is further known that flocculation, and therefore the stability, of the beers is advantageously influenced by the high temperature and violent agitation during boiling. 85

Another object of the present invention is to provide an improved method of and apparatus for enabling the heating 90

of worts to be effected in such a manner that the advantages indicated above can be obtained without the attendant disadvantages of prolonged exposure to high temperatures.

According to the present invention the whole wort is withdrawn from a reception vessel and circulated by means such as a centrifugal pump through a closed circuit incorporating the reception vessel and a heating apparatus, such as, for example a plate type heat exchanger, which is separate from the reception vessel so that the wort passes from the reception vessel to the heating apparatus. from the latter back into the reception vessel, then through the heating apparatus again and so on and wherein by throttling at a convenient point between the heating apparatus and the reception vessel the wort is subjected to pressure and heated to a temperature above the temperature corresponding with the static pressure prevailing in the reception vessel itself, so that after passing the throttling device and releasing the pressure, the wort is subjected to partial self-evaporation. If desired, the hops can be placed in a separate vessel so associated with the system or circuit that the wort can be caused to pass through such vessel for hop extraction purposes and, if desired, such vessel may be arranged in a valve controlled by-pass.

In the accompanying drawing there is illustrated diagrammatically one mode of carrying out the invention in which completely or partially refined worts from the mash filter or other refining apparatus (or, in some instances, the worts may even be unrefined) are passed into a suitable vessel, e.g. a brewing pan or any other open or closed vessel 1, which is provided with a vapour outlet and is arranged in a circulatory system, including a pump 2 and a heating apparatus, such as a plate type heat exchanger 3, which is separate from the said vessel, the arrangement being such that the worts can be circulated continuously through the heater and the brewing pan or the like. In the return pipe 4 leading from the heater to the brewing pan, there is arranged a throttle 5 consisting of a cock or the like by which the liquor at the inlet side thereof can be maintained at a pressure greater than the static pressure prevailing within the vessel 1. By means of steam, superheated water, electrical or other heating means, the fluid during its passage through the heating apparatus 3 is brought to a temperature which is higher than that it would be under the static pressure pre-

vailing within the vessel 1. Hence, it will be seen that in passing through the throttle the pressure of the fluid will be reduced from a pressure greater than atmospheric to that prevailing within the vessel 1 and that a quantity of heat corresponding with the difference in the latent heats before and after throttling will be released.

It will be appreciated that the particular conditions, such as temperatures, evaporating periods, and circulation speeds chosen in any instance will depend upon the quality of the brew and can, if necessary, be adjusted during the carrying out of the process according to the progress of the treatment.

The hopping process can be carried out directly in the vessel 1 which, in this case, is provided with a suitable form of screening device for keeping back the coarse hop ingredients or the said hopping process may be carried out by using hop extractors arranged at a suitable point in the circulatory system, or in a bye-pass associated therewith. For example, an extractor may be arranged as shown at 6 connected with the heating apparatus so that by the opening of appropriately arranged valves the wort when at a predetermined temperature can be passed into the hop extractor and then afterwards re-introduced into the heating apparatus. If desired only a portion of the wort may be passed through the hop extractor, or alternatively only the spargings or again fresh wort and spargings separately.

If it be desired to keep the whole or part of the wort or its components (i.e. first wort or spargings) at any given temperature for a short period, one or more closed vessels may be arranged at convenient points in the circulation system, either within the heat exchanging apparatus or external thereto, the worts passing through the vessel or vessels without substantial change of temperature.

Also, in some instances, gas or air under pressure may be introduced into the circulating wort. For example, an injector-like gas delivery tube may be provided as shown at 8. By a suitable choice of the pressure in the compressed gas and by suitable orifices, valves or regulating cocks, the quantity of gas introduced can easily be controlled.

If desired, after the completion of the evaporation process, the apparatus previously serving as a heating element, may be supplied with a cooling medium and the boiled wort may be then passed through the same apparatus for the purpose of cooling.

We are aware that it has previously been proposed to boil wort under pressure by drawing the wort from a copper and forcing the same by a pump through a
 5 check valve into a heater having its outlet connected with a cooler which is provided at its outlet with an adjustable escape valve which remains closed until the pressure caused by the pump and the
 10 rising temperature overcomes the resistance of the valve and opens the same.

Having now particularly described and ascertained the nature of our said invention, and in what manner the same is to
 15 be performed, we declare that what we claim is:—

1. A method of treating worts, especially beer worts, wherein the whole wort is withdrawn from a reception vessel and circulated by means such as a centrifugal pump through a closed circuit incorporating the reception vessel and a heating apparatus, such as, for example, a plate type heat exchanger, which is
 20 separate from the reception vessel so that the wort passes from the reception vessel to the heating apparatus from the latter back into the reception vessel, then through the heating apparatus again and
 25 so on and wherein by throttling at a convenient point between the heating apparatus and the reception vessel the wort is subjected to pressure and heated to a temperature above the temperature
 30 corresponding with the static pressure prevailing in the reception vessel itself, so that after passing the throttling device and releasing the pressure, the wort is subjected to partial self-evaporation.

2. A method of treating worts, especially beer worts, in accordance with claim 1, characterised in this that the wort is circulated in such a manner that
 40 pauses are provided during the circulation in order to give the wort the opportunity to complete its inner actions at rest, which pauses are followed by a fresh circulation and evaporation.

3. Apparatus for carrying out the
 50 method claimed in claim 1 or 2, characterised in this, that the reception vessel is formed as an open vessel.

4. Apparatus for carrying out the method claimed in claim 1 or 2 characterised in this, that the reception vessel
 55 is a closed one, with a vapour outlet under pressure.

5. A method of treating worts as claimed in claim 1 or 2 characterised in this, that the hops are added directly into
 60 the reception vessel which is provided with a screening device to keep back the hops.

6. A method of treating worts as claimed in claim 1 or 2, in which the hop extraction treatment is carried out by
 65 passing a part or the whole of the worts through a separate vessel arranged in bye-pass associated with the circulatory system or the heating apparatus.

7. Apparatus for carrying out the
 70 method claimed in claim 1 or 2 having a hop extractor interposed at a convenient place between the circulation pump and the throttling device, the worts being circulated by complete or partial withdrawal
 75 and return or non-return, from the heating apparatus.

8. A method of treating worts as claimed in claim 1 or 2 characterised in this, that the whole or part of the wort
 80 or its components is passed into one or more closed vessels or chambers arranged at a convenient point or points in the circulation system either within the heat exchanging apparatus or external there-
 85 to, so that the worts or the like pass through the said chamber or chambers without substantial change of temperature.

9. A method of treating worts as
 90 claimed in claim 1 or 2 or 3 characterised in this, that during the operating process, not only the temperatures, but also the circulation speeds are altered, in order to adapt the operation to the progress of the
 95 process.

10. A method of treating worts substantially as hereinbefore described with reference to the accompanying drawing.

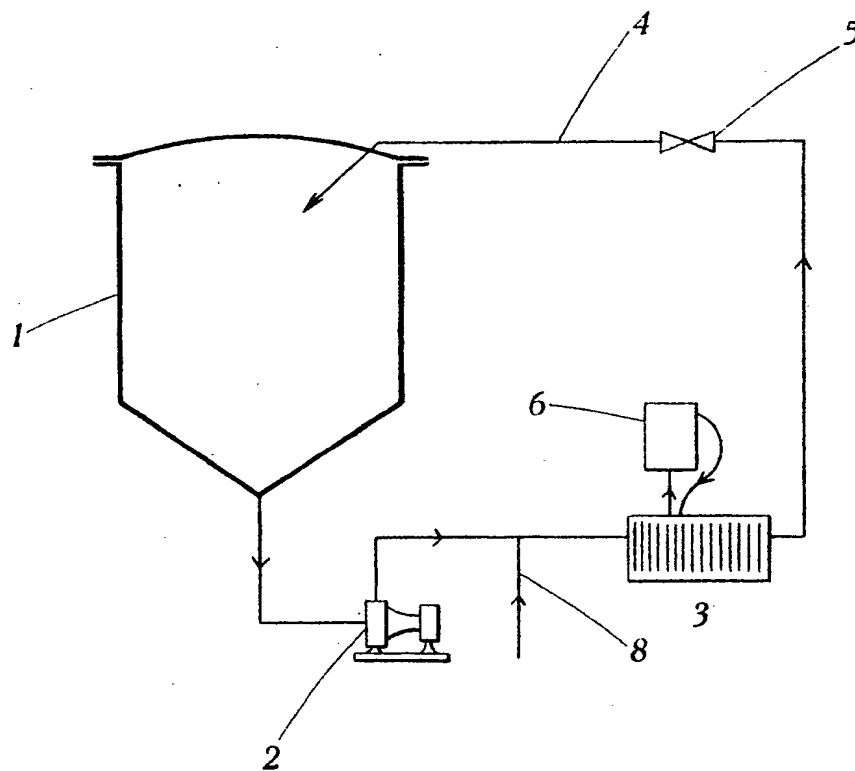
Dated this 10th day of February, 1938.

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[This Drawing is a full-size reproduction of the Original.]



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